Siluro-Devonian tectonostratigraphic relationships, in the Portage Brook area, northern New Brunswick: implications for timing of D_2 deformation in the Bathurst Mining Camp

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The Portage Brook area, located near the northwestern part of the Bathurst Camp, is underlain by Siluro-Devonian rocks of the Matapedia Cover Sequence which are in fault and unconformable contact with Cambro-Ordovician rocks of the Bathurst Camp. Chaleurs Group rocks have been recognized for the first time west of the Portage Brook Fault, a northerly trending fault that forms the boundary with Bathurst Camp rocks to the east. In this area, the Chaleurs Group consistently dips to the northwest and has been subdivided into three lithological units: conglomerate, sandstone and siltstone of the Simpsons Field Formation; felsic volcanic rocks of the Benjamin Formation; and thickly bedded, brown-grey to reddish grey sandstone of the Greys Gulch Formation. The Greys Gulch Formation is conformably overlain by volcanic rocks of the Devonian Tobique Group. A north-east-trending normal fault that runs through second Portage Lake repeats the Siluro-Devonian sequence to the north and cuts off the Portage Brook Fault.

Four, or perhaps five, stages of deformation are now recognized in the Bathurst Camp, which are attributed to: Late Ordovician subduction, associated with closure of a back arc basin (D_1); Late Silurian sinistral transpression resulting from oblique collision (D_2); Early Devonian extensional collapse (D_3); and Middle Devonian dextral transpression (D_4). In the Portage Brook area Cambro-Ordovician rocks were deformed into a series of tight to isoclinal, upright F_2 folds and imbricated by associated D_2 thrusts. Near Upsalquitch Lake the F_2 folds are re-oriented by D_3 deformation into a "flat belt" of recumbent folds overturned to the southeast. The earlier structures are subsequently folded around a north-northwest-trending, regional-F_4 antiform. East-northeast-trending, upright folds and a northeasterly striking slaty cleavage, are most likely coeval with late stage D_4 or perhaps D_5 deformation in the Bathurst Camp.

The Late Silurian to Early Devonian Mount Elizabeth Intrusive Complex cuts both the Silurian and Cambro-Ordovician rocks. A Late Silurian (414 +11/- 1 Ma) alkaline granite appears to grade laterally into and be coeval with volcanic rocks of the Benjamin Formation and has clearly intruded, and altered to hornfels, clastic rocks of the Simpsons Field Formation. The presence of two pre-entrainment cleavages in Ordovician pebbles in the Simpsons Field Formation, therefore, suggests that D_2 deformation in the Bathurst Mining Camp occurred prior to Late Silurian, contrary to earlier interpretations. Furthermore, an elongated, north-northwest trending, composite mafic intrusion, interpreted to be contemporaneous with Late Silurian (418 ± 1) peraluminous granite of the Mount Elizabeth Intrusive Complex, is situated within the Cambro-Ordovician rocks and clearly truncates D_2 thrusts and folds.

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